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storing the object
and image data.

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observing the object and data.

4. The method, in the frequency magnification is high

5. The method, when the magnification threshold magnification of electron microscope detected at a frequency magnification.

6. The method, in the threshold magnification with an error is obtained by method of different magnification

7. The method, in measured value is set so that it is continuously increased

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8. The method as claimed in claim 5,
wherein a second magnification is selected as the
threshold magnification when a difference between a
first measured value obtained at a first
5 magnification and a second measured value obtained
at the second magnification smaller than the first
magnification exceeds a predetermined value.

9. A method of controlling a scanning
electron microscope, the method comprising the steps
of:

15 irradiating a surface of a sample object
with an electron beam; and

detecting electrons released from the
surface of the sample object due to the irradiation,
wherein:

20 a first scanning range in a first
direction of two different directions on the surface
of the sample object is selected in accordance with
a detection magnification on the surface of the
sample object, while a second scanning range in a
25 second direction of the two different directions is
fixed; and

the electron detection is performed at
intervals $T = (FOV1/FOV2) \times t1$, with the first
scanning range being FOV1, the second scanning range
30 being FOV2, and an initial value of the intervals
being t1.

35 10. The method as claimed in claim 9,
wherein, among all data obtained as a result of the

detection, data corresponding to a ratio of FOV1/FOV2 is extracted as image data, and an image at the detection magnification on the surface of the sample object is displayed based on the image data.

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11. The method as claimed in claim 9,
10 wherein:

a switching time B is determined by $S/(FOV1/FOV2)$, with an electron beam scanning time S;

only data obtained by detecting electrons
15 during a period between the switching time B after a scanning start and a time 2B are stored; and

an image is displayed at a magnification on the surface of the sample object in accordance with the data.

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12. A scanning electron microscope,
25 comprising:

an irradiating unit that irradiates an object with an electron beam; and

a detecting unit that detects electrons released from the object due to the irradiation, at
30 a frequency depending on a magnification at which the object is observed.

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13. The scanning electron microscope as claimed in claim 12, further comprising:

a data extracting unit that extracts image data by an inverse number rate of the magnification from all data obtained as a result of the detection; and

5 a display unit that displays an image at the magnification for observing the object in accordance with the extracted image data.

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14. The scanning electron microscope as claimed in claim 12, further comprising:

15 a data storing unit that stores only data obtained during a predetermined period of time corresponding to the magnification, from all data obtained as a result of the detection; and

20 a display unit that displays an image at the magnification for observing the object, in accordance with the stored data.

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15. The scanning electron microscope as claimed in claim 12, wherein the frequency is higher when the magnification is higher.

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16. The scanning electron microscope as claimed in claim 15, further comprising a storage unit that stores a threshold magnification in advance,

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wherein the detecting unit detects electrons at a frequency depending on a

magnification that is higher than the threshold magnification stored in the storage unit.

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17. The scanning electron microscope as claimed in claim 16, further comprising a threshold magnification determining unit that calculates an error distribution of measured values obtained by measuring a test pattern at different magnifications, and determines the threshold magnification depending on the error distribution.

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18. The scanning electron microscope as claimed in claim 17, wherein the threshold magnification determining unit sequentially sets the magnification when the test pattern is measured, so that the magnification monotonically increases and decreases.

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19. The scanning electron microscope as claimed in claim 16, wherein, when a difference between a first measured value obtained at a first magnification and a second measured value obtained at a second magnification exceeds a predetermined value, the second magnification is stored as the threshold magnification in the storage unit.

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20. A scanning electron microscope that irradiates a surface of a sample object with an electron beam so as to detect electrons released from the surface of the sample object due to the irradiation, said microscope comprising:

a scanning unit that determines a first scanning range in a first direction of two different directions on the surface of the sample object in accordance with a detection magnification for the surface of the sample object, while maintaining a second scanning range in a second direction of the two different directions constant; and

a detection timing determining unit that determines intervals T for detecting electrons by $(FOV1/FOV2) \times t1$, the first scanning range being $FOV1$, the second scanning range being $FOV2$, and an initial value of detection intervals being $t1$.

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21. The scanning electron microscope as claimed in claim 20, further comprising:

a data extracting unit that extracts data corresponding to a ratio of $FOV1/FOV2$ as image data from all data obtained as a result of the detection; and

a display unit that displays an image based on the image data at the detection magnification for the surface of the sample object.

22. The scanning electron microscope as claimed in claim 20, further comprising:

a switching time calculating unit that

FOV2/FOV1 = 2.0000000000000000

determines a switching time B by $S/(FOV2/FOV1)$, with an electron beam scanning time being S;

5 a data storage unit that stores data obtained by detecting electrons only during a period between the switching time B after a scanning start and a time 2B; and

10 a display unit that displays an image at the magnification for the surface of the sample object based on the data stored in the data storage unit.

15 23. A method of controlling a scanning microscope, comprising the steps of:

20 irradiating an object with an electron beam focused on a surface of the object, the electron beam having an electron current density corresponding to a first magnification factor on a surface of the object;

detecting secondary electrons emitted from the object in response to an irradiation of the object with the electron beam;

25 acquiring a two-dimensional image of the object with the first magnification factor, by sampling the secondary electrons with a first frequency corresponding to the first magnification factor;

30 selecting a region in the two-dimensional image;

scanning the selected region with the electron beam, the electron beam having the electron current density on the surface of the object;

35 detecting secondary electrons emitted from the region in response to an irradiation of the region with the electron beam;

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acquiring a two-dimensional image of the region with a second, larger magnification factor, by sampling the electron beam with a second sampling frequency corresponding to the second magnification factor, the second sampling frequency being larger than the first sampling frequency.

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24. The method as claimed in claim 23, further comprising the steps of:

selecting a sub-region in the two-dimensional image of the region; and
15 producing a two-dimensional image of the sub-region, by eliminating data of the two-dimensional image of the region outside the sub-region.

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25. The method as claimed in claim 23, further comprising the step of measuring a pattern size based on the two-dimensional image of the sub-region.

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